01-280-2111
CABLE ASSY, SPEC

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
GENERAL USE		A	ORIGINAL RELEASE	90-08-15	80-C-0054 ED-ER (DK)
		B	PER ECP N4TDAZZ018 NOR 010	10-26-94	ED TC HA

NOTE: DATA MARKED WITH AN ASTERISK (*) IS PECULIAR TO A PRIOR MANUFACTURER. IT DOES NOT TAKE PRECEDENCE OVER ANY OTHER DATA ON THIS DRAWING AND IS NOT CONTRACTUALLY BINDING ON EITHER THE CONTRACTOR OR THE GOVERNMENT.

VENDOR ITEM DRAWING

REVISION	A	A	A	B															
SHEET	21	22	23	24															
REVISION	B	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Unless otherwise specified
Dimensions are in inches
Tolerances on
Fractions decimals angles

BRUNING 40-105 50204

HARRIS PII NO.
DAAK 80-80-C-0054

CORADCOM
REVIEWED ED-ER (DK)
APPROVED ED-RS (DC)
DATE 90-09-26

U. S. ARMY COMMUNICATIONS RESEARCH AND DEVELOPMENT COMMAND
FORT MONMOUTH NEW JERSEY 07703

CABLE ASSEMBLIES, HIGH VOLTAGE

SIZE	CODE IDENT. NO.	
A	56996	84016057

SCALE: SHEET 1 of 24

WHEN REFERING TO THIS DRAWING STATE DRAWING NO., APPLICABLE ISSUE LETTER IF ANY, AND D/

See: Sht 11 for (PN: B4016057-4)
Sht 24 for Source Mftrs

1.0 SCOPE

This specification establishes the requirements for high voltage cable assemblies for use in ground military communications equipment.

2.0 APPLICABLE DOCUMENTS

The following documents of the issue in effect on the date of the purchase order form a part of this specification to the extent specified herein. In the event of conflict between this specification and the applicable documents, this specification shall govern.

Specifications - Military

MIL-F-14256	Flux, Soldering, Liquid (Rosin Base)
MIL-G-45204	Gold Plating, Electrodeposited
MIL-I-45208	Inspection System Requirements
MIL-M-81531	Marking of Electrical Insulating Materials

Specifications - Federal

QQ-S-571	Solder, Tin Alloy, Lead-Tin Alloy and Lead Alloy

Standards - Military

MIL-STD-130	Identification Marking of U.S. Military Property
MIL-STD-202	Test Methods for Electronic and Electrical Component Parts

Specifications - U.S. Army Electronics Command (USAECOM)

SM-B-889927	Receptacle, Glass Epoxy

Specifications - Industry

ASTM-B-140	Copper-Zinc-Lead (Leaded Red Brass or Hardware Bronze) Rod, Bar, and Shapes, Spec for.

*0046-4

SIZE	CODE IDENT NO.	
A	56896	B4016057
SCALE	A Rev	SHEET 2

3.0 **REQUIREMENTS**

3.1 **Mechanical**

3.1.1 Outline and Dimensions

The outline and dimensions of cable assemblies shall be as shown in Figures 1 - 8. The connectors, terminal lug, and cable shall be as specified in Figures 9 - 15.

3.1.2 Conductor Termination

The inner conductor shall be soft-soldered within the connector, or crimped. Solder shall be SN60 or SN63 per QQ-S-571. Flux shall be rosin or rosin-mildly activated per QQ-S-571 or MIL-F-14256 (Type R or RMA). All flux residue shall be removed.

3.1.3 Part Marking

The assemblies shall be permanently marked per MIL-STD-130 as specified on the applicable figure. Part marking shall be by direct ink stamping of the cable. The marking shall meet the performance and size requirements of MIL-M-81531.

3.1.4 Materials

3.1.4.1 Conductors

Conductors shall be stranded, silver plated or tin plated soft copper wire as specified in the applicable figure.

3.1.4.2 Cable Insulation

The cable insulation shall be a soft, abrasion resistant, white silicone, flexible at -55°C and suitable for continuous use at +125°C, or +200°C, as specified on the applicable figure. The material shall be suitable for use at the voltage specified. It shall be suitable for use in the military environment specified.

3.1.4.3 Connectors

The connectors shall be made from a soft silicone rubber with the contact specified. The connectors shall be suitable for the voltage specified. They shall prevent liquid water penetration of the connections at the connector-connector interface and at the connector-cable interface of assemblies.

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A	56996	

SCALE | A Rev | SHEET 3

3.1.4.4 Connector Contacts

Connector contacts shall be made from beryllium copper per QQ-C-530, or bronze per ASTM-B-140. They shall be gold plated per MIL-G-45204, Type II (.000020 inch minimum gold over .000030 inch nickel).

3.1.5 Bend Radius

The bend radius over the uncovered silicone cable insulation shall be not greater than .25 inch.

3.2 Electrical

The cable assemblies shall be suitable for long term use in the military environment specified herein, without exhibiting corona or ozone damage.

3.2.1 Dielectric Withstanding Voltage

The cable assemblies shall pass the dielectric withstanding voltage requirements of the applicable figure when tested per MIL-STD-202, Method 301, with a leakage current not greater than 5 microamperes.

3.2.2 Resistance

The mated and unmated cable assembly resistance shall be as follows:

AWG	Conductor Resistance, Ohms per Ft, Max	Additional Ohms per Connector, Max
16	.005	.001
18	.006	.001
20	.010	.001

3.2.3 Current Carrying Capability

At 25°C ambient temperature, a mated cable assembly shall be capable of carrying the following continuous currents:

Conductor AWG	Current, Amperes
16	10
18	7.6
20	5.8

3.3 Environmental Conditions

3.3.1 Non-Operating

The item shall be designed and constructed to comply with the operational requirements after subjection to any of the following non-operating conditions:

3.3.1.1 Thermal

Continuous exposure at -70°F (-57°C) for periods of up to 12 hours to +160°F (+71°C) for periods up to 4 hours daily and with negligible air movement.

3.3.1.2 Relative Humidity

As low as 5% at an air temperature of +120°F (+49°C); as high as 100% at all temperatures from -25°F (-32°C) to +86°F (+30°C) with condensation at all temperatures lower than +86°F (+30°C).

3.3.1.3 Salt Atmosphere

As encountered during coastal service and ocean transport.

3.3.1.4 Altitude

Up to 50,000 feet above sea level.

3.3.1.5 Tropical Conditions

As encountered in tropical areas including fungus laden air.

3.3.1.6 Vibration

5-200-5 Hz sinusoidal cycling; 10 G's (peak) sweep time 12 min. per cycle, 84 min. per axis; 3 mutually perpendicular axes.

3.3.1.7 Shock

40 G's peak, half sine wave pulse 6 ms duration, vertical and horizontal, 3 axes.

3.3.2 Operating

The item shall provide continuous (24 hours per day) operation and shall meet the performance requirements of this specification while being subjected to any possible combinations of the following conditions:

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3.3.2.1 Thermal

-25°F (-32°C) to +150°F (+65°C)

Note: Components shall be capable of operation without damage at temperatures of -70°F (-57°C) to +150°F (+65°C).

3.3.2.2 Relative Humidity

As low as 5% at an air temperature of +120°F (+49°C); as high as 100% at all temperatures from -25°F (-32°C) to +86°F (+30°C) with condensation at all temperatures lower than +86°F (+30°C).

3.3.2.3 Salt Atmosphere

As encountered in coastal areas.

3.3.2.4 Altitude

Up to 10,000 feet above sea level.

3.3.2.5 Tropical Conditions

As encountered in tropical areas including fungus laden air.

3.4 Workmanship

Cable assemblies shall be processed in such a manner as to be uniform in quality, shape, dimensions and performance and shall permit interchangeability of assemblies of the same type and design. Interfaces shall be free of sharp edges, burrs, damages and contaminants. The outer surface shall be free of cuts, nicks, and frayed or burred spots that might affect the performance of the assembly. Connectors shall fit tightly together and over the cable and be capable of preventing moisture entrance into the assembly.

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4.0 QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

Unless otherwise specified in the contract or order, the manufacturer is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the manufacturer may utilize his own facilities or any other commercial laboratory suitable for the performance of this inspection. The procuring activity reserves the right to require the contractor to perform any tests or examination deemed necessary to determine individual or lot conformance to requirements of this specification. Lack of a test herein does not relieve a manufacturer of responsibility for meeting a requirement.

4.2 Quality Control System

The system of quality control shall be per MIL-I-45208. Special processes shall be controlled and supported by responsible management policies and procedures.

4.3 Visual and Mechanical Inspection

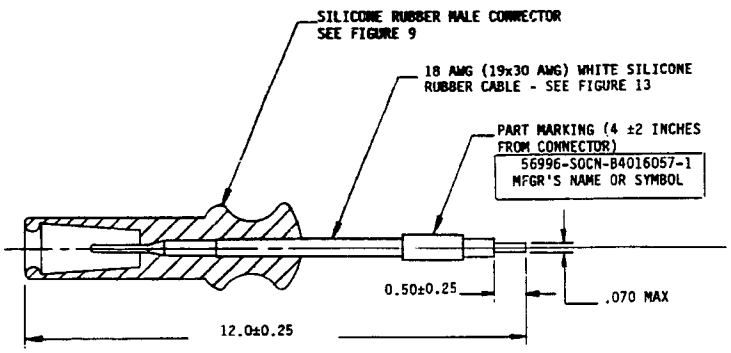
The cable assemblies shall be inspected to verify conformance to the following requirements:

Conductor Termination
Contact Retention
Materials
Construction
Finishes
Workmanship
Marking
Dimensions (Including Correct Connectors)

4.4 Electrical Inspection

The cable assemblies shall be inspected to verify conformance to the following requirements:

Dielectric Withstanding Voltage
Resistance



ASSEMBLY RATING:

1. Operating Voltage: 30,000 VDC
2. Operating Temperature Range: -55° to +200°C

FIGURE 1. Connector-Cable Assembly (-1 Only)

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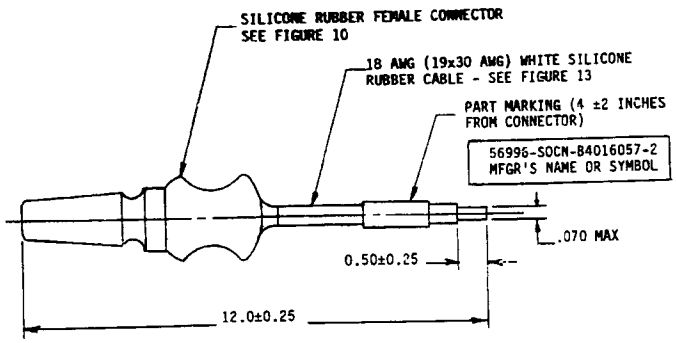
A	56996	B4016057
SCALE	A Rev	SHEET 8



Assembly Rating:

1.	Operating Voltage:	30,000 VDC
2.	Operating Temprature Range:	-55° to 200°C

FIGURE 2. Connector-Cable Assembly (-2 Only)

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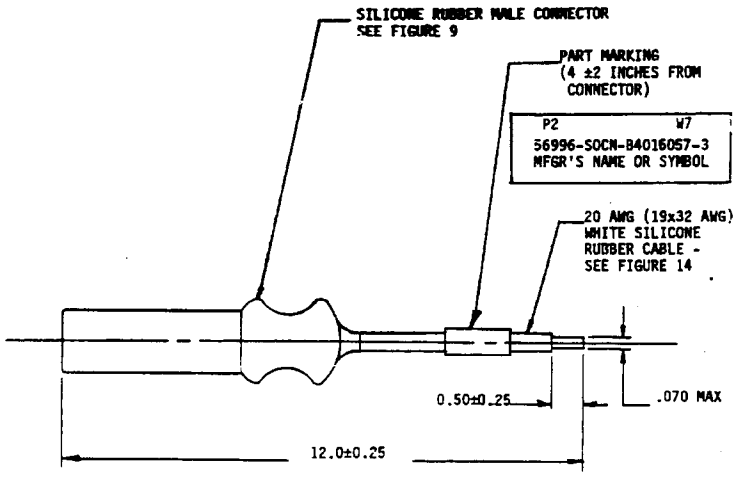
A	56996	84016057
SCALE	A Rev	SHEET 9

FORM 409042-B



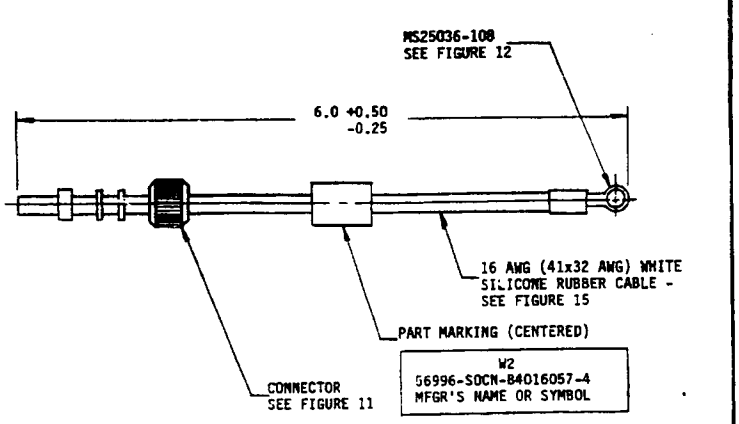
Assembly Rating:

1. Operating Voltage: 30,000 VDC
2. Operating Temperature Range: -55° to +200°C

FIGURE 3. Connector-Cable Assembly (-3 Only)

0046-4

SIZE	CODE IDENT NO.	
A	56996	B4016057
SCALE	A Rev	SHEET 10

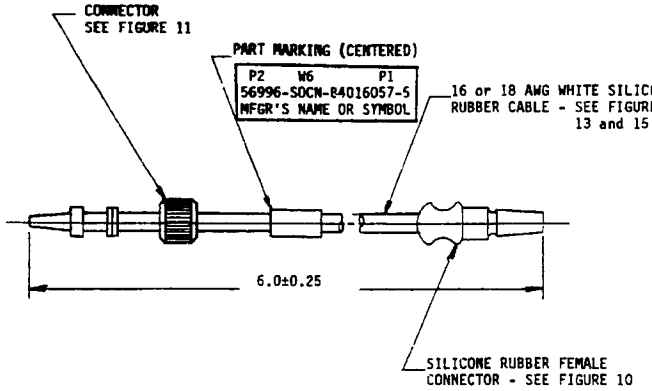


Assembly Rating:

1. Operating Voltage:	10,000 VDC
2. Qualification HiPot- 70,000 ft, -55° and +125°C, 3 min, 5 microamps max leakage	15 KVDC
3. Acceptance Hipot- Sea level, 25°C 3 min, 5 microamps max leakage	15 KVDC
4. Operating Temperature Range:	-55° to +125°C

FIGURE 4. Connector-Cable-Terminal Lug Assembly (-4 Only)

SIZE	CODE IDENT NO.	
A	56996	84016057
SCALE	A Rev	SHEET 11



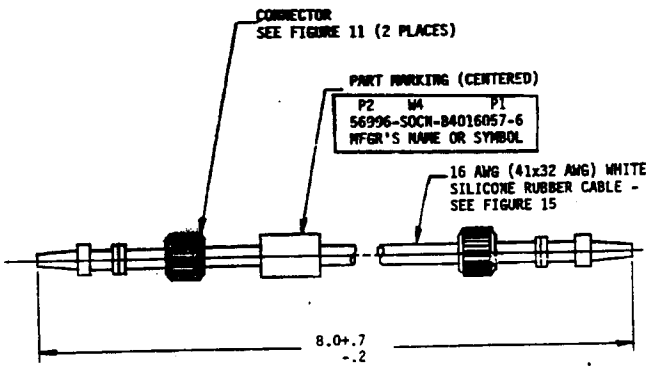
Assembly Rating:

1.	Operating Voltage	10,000 VDC
2.	Qualification Hipot- 70,000 ft, -55° and +125°C, 3 min, 5 microamps max leakage	15KVDC
3.	Acceptance Hipot- sea level, 25°C, 3 min, 5 microamps max leakage	15KVDC
4.	Operating temperature range:	-55° to +125°C

FIGURE 5. Connector-Cable-Connector Assembly (-5 Only)

*0046-4

SIZE	CODE IDENT NO.	
A	56996	B4016057
SCALE	A Rev	SHEET 12



Assembly Rating:

1. Operating voltage:	10,000 VDC
2. Qualification Hipot- 70,000 ft, -55° and +125°C 3 min, 5 microamps max leakage	15KVDC
3. Acceptance Hipot- sea level, 25°C 3 min, 5 microamps max leakage	15KVDC
4. Operating temperature range:	-55° to +125°C

FIGURE 6. Connector-Cable-Connector Assembly (-6 Only)

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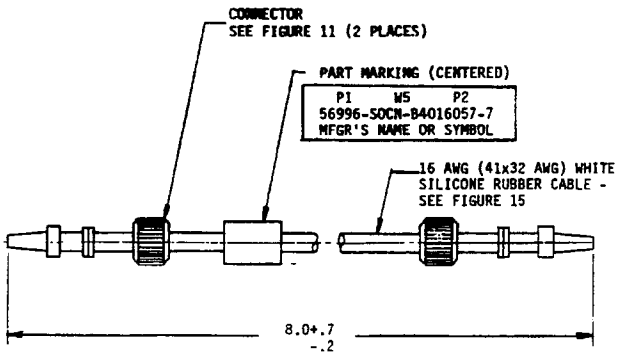
SIZE	CODE IDENT NO.	
A	56996	B4016057
SCALE	A Rev	SHEET 13



Assembly Rating:

1.	Operating voltage:	10,000 VDC
2.	Qualification Hipot- 70,000 ft, -55° and +125°C, 3 min, 5 microamps max leakage	15KVDC
3.	Acceptance Hipot- sea level, 25°C, 3 min, 5 microamps max leakage	15KVDC
4.	Operating temperature range:	-55° to +125°C

FIGURE 7. Connector-Cable-Connector Assembly (-7 Only)

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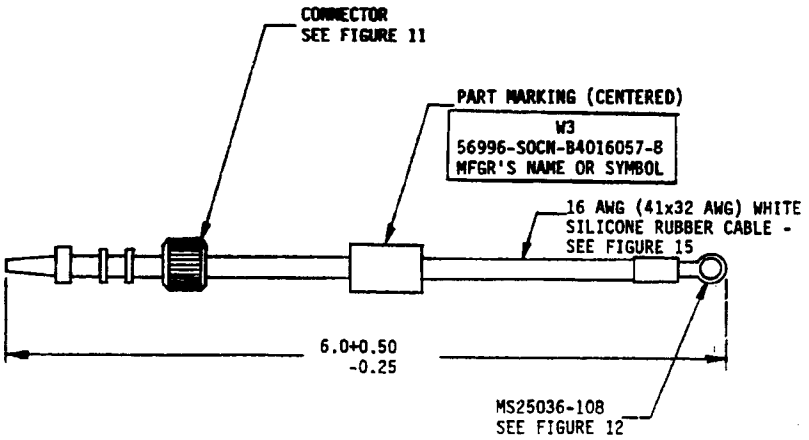
SIZE	CODE IDENT NO.	
A	56996	B4016057
SCALE	A Rev	SHEET 14



Assembly Rating:

1.	Operating voltage:	10,000 VDC
2.	Qualification Hipot- 70,000 ft, -55° and +125°C 3 min, 5 microamps max leakage	15KVDC
3.	Acceptance Hipot- sea level, 25±C, 3 min, 5 microamps max leakage	15KVDC
4.	Operating temperature range:	-55° to +125°C

FIGURE 8. Connector-Cable-Terminal Lug Assembly (-8 Only)

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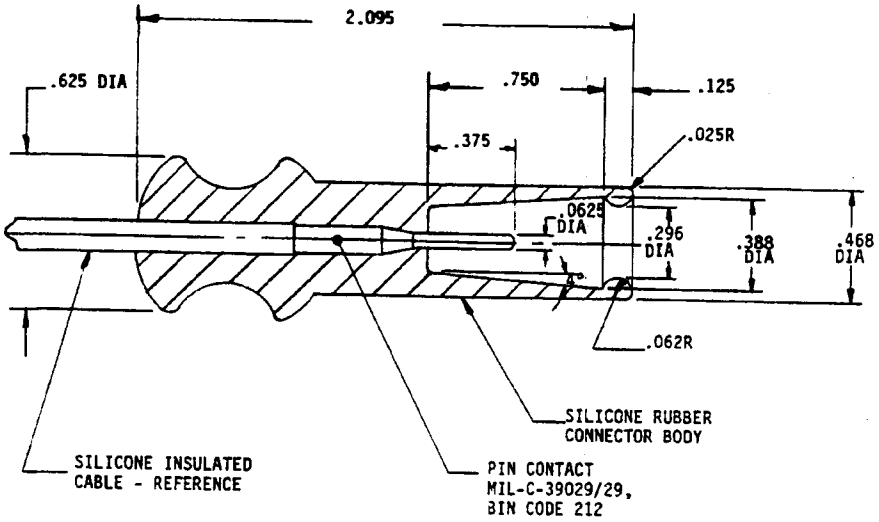
SIZE	CODE IDENT NO.	
A	56996	B4016057
SCALE	A Rev	SHEET 15



Notes:

1. Mating cable: See Figures 13, 14, and 15.
2. Dielectric withstanding voltage, 30KVDC.
3. Contact shall be bonded to connector body with silicone adhesive.
4. For cable assembly, cable shall be bonded to connector using a silicone adhesive. The bondline shall prevent liquid water entry into the connector.
5. When mated with connector specified in Figure 10, they shall form a water and air tight connection and meet all cable assembly requirements.

FIGURE 9. Connector, Male, Pin Contact, Silicone Body, 30KVDC

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SIZE	CODE IDENT NO.	
A	56996	84016057
SCALE	A Rev	SHEET 16

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FORM 4090-2-8

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SIZE	CODE IDENT. NO.	DRAWING NO.
A	56996	B4016057

SCALE	REV	SHEET
	A	17

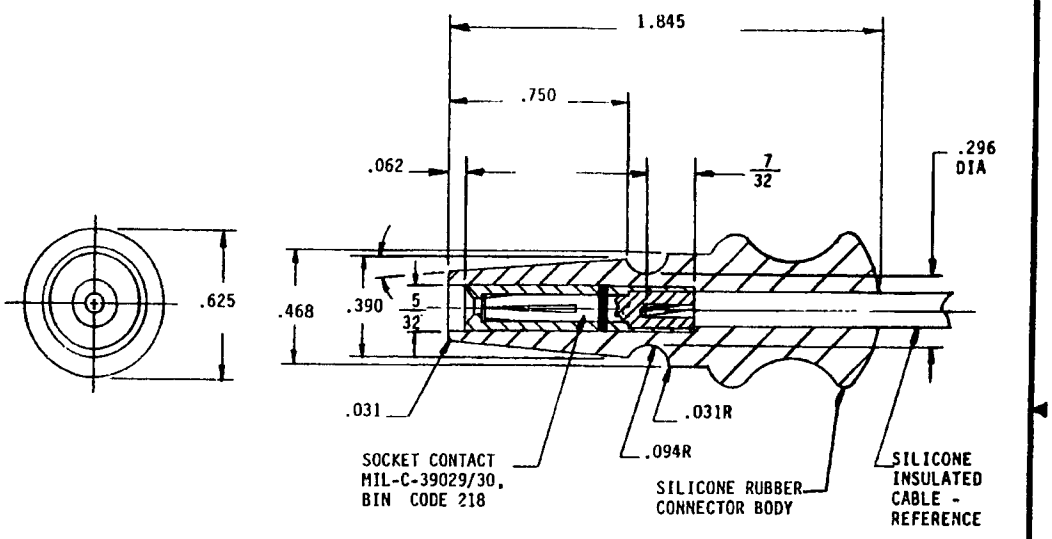


FIGURE 10 - CONNECTOR, FEMALE, SOCKET CONTACT SILICONE BODY, 30,000 VDC

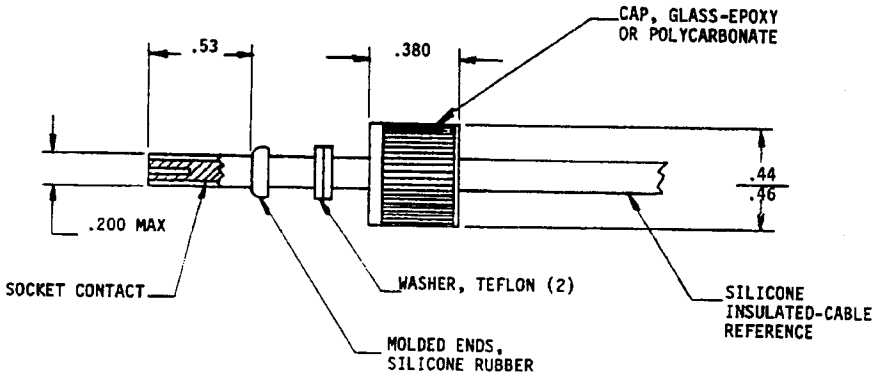
NOTES:

1. Mating cable: See Figures 13, 14, and 15.
2. Dielectric withstanding voltage, 30KVDC.
3. Contact shall be bonded to connector body with silicone adhesive.
4. For cable assembly, cable shall be bonded to connector using a silicone adhesive. The bond line shall prevent liquid water entry into the connector.
5. When mated with connector specified in Figure 9, they shall form a water and air tight connection and meet all cable assembly requirements.
6. Tolerances:
   .xxx ±.005
   Angles ± 30 minutes

FIGURE 10. Connector, Female, Socket Contact, Silicone Body, 30,000VDC (CONTINUED)

*0046-4

SIZE	CODE IDENT NO.	B4016057
A	56996	
SCALE	A Rev	SHEET 18



Notes:

1. Mating Cable: See Figures 13, 14, and 15.
2. Continuous dielectric withstanding voltage: 10KVDC
3. Connector shall mate with SM-B-889927 (AMP P/N 830178-1), form a water tight assembly, and meet the cable assembly requirements.
4. Tolerances unless otherwwise specified:
   .xx ±.02
   .xxx ±.005

FIGURE 11. Connector, Female, Socket Contact, 10,000VDC

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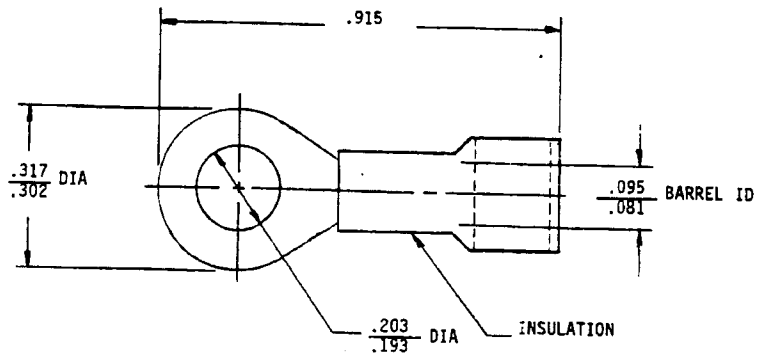
SIZE	CODE IDENT NO.	
A	56996	B4016057
SCALE	A Rev	SHEET 19



Note: Terminal lug shall conform to MS25036-108.
This figure provided for reference only.

FIGURE 12. Terminal Lug, MS25036-108

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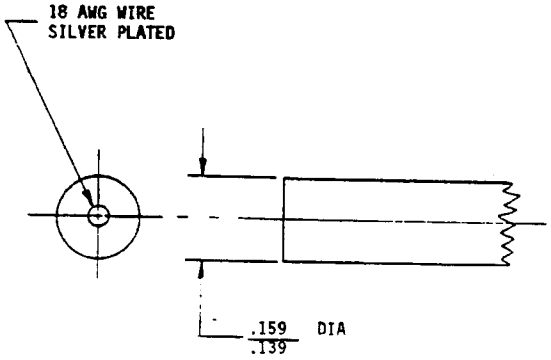
SIZE	CODE IDENT NO.	84016057
A	56996	
SCALE	A Rev	SHEET 20



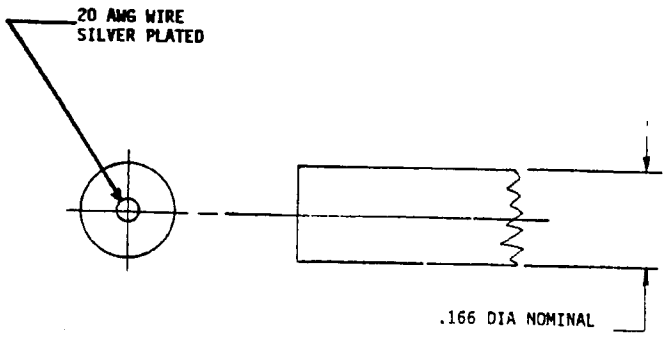
Notes:

1. Conductor: 18 AWG (19 strands, 30 AWG) soft copper wire, silver or tin plated, .046-.052 dia.
2. Jacket: High voltage white silicone rubber, flexible at -55°C, suitable for continuous operation at 200°C.
3. Assembly: The cable shall pass a 30KVDC Hipot test at sea level at 25°C with a current leakage not greater than 5 microamps.

FIGURE 13. Cable, 18 AWG, Silicone, White

*0046-4

SIZE	CODE IDENT NO.	
A	56996	B4016057
SCALE	A Rev	SHEET 21



Notes:

1. Conductor: 20 AWG (19 strands, 32 AWG) soft copper wire, silver or tin plated.
2. Jacket: High voltage white silicone rubber, flexible at -55°C, suitable for continuous operation at 200°C.
3. Assembly: The cable shall pass a 30KVDC Hipot test at sea level at 25°C with a current leakage not greater than 5 microamps.

FIGURE 14. Cable, 20 AWG, Silicone, White

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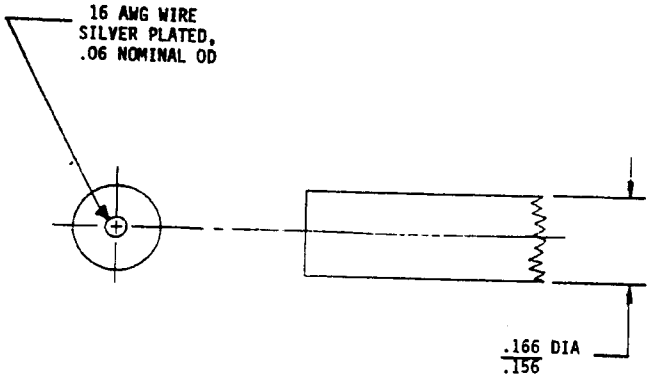
SIZE	CODE IDENT NO.	
A	56996	B4016057
SCALE	A Rev	SHEET 22



Notes:

1. Conductor: 16 AWG (41 strands, 32 AWG) soft copper wire, silver or tin plated.
2. Jacket: High voltage white silicone rubber, flexible at -55°C, suitable for continuous operation at +125°C.
3. Assembly: The cable shall pass a 15KVDC Hipot test at sea level at 25°C with a current leakage not greater than 5 microamps. It shall be suitable for continuous operation at 10KVDC.

FIGURE 15. Cable, 16 AWG, Silicone, Jacket, White

0046-4

SIZE	CODE IDENT NO.	
A	56956	B4016057
SCALE	A Rev	SHEET 23

5.0 PREPARATION FOR DELIVERY

Components covered by this specification shall be packaged and marked in accordance with good commercial practice and in a fashion to prevent degradation of electrical or mechanical characteristics during transit. Delivery shall be as stated in the purchase document.

6.0 SUGGESTED SOURCE(S) OF SUPPLY

Identification of the "Suggested Source(s) of Supply" hereon is not to be construed as a guarantee of present or continued availability as a source of supply for the item(s).

~~Rowe Industries~~
Toledo, OH
Their Code Ident (FSCM) No.: 82878
Their Part No.: See Below

NO LONGER in Buss. Bought by Reynold Ind Inc

AMP Incorporated
Harrisburg, PA
Their Code Ident (FSCM) No.: 00779
Their Part No.: See Below

Reynolds Industries, Inc.
Marina Del Rey, CA
Their Code Ident (FSCM) No.: 99747
Their Part No.: See Below

DASH NO.	FIG NO.	IDENTIFYING PART NUMBER	ROWE PART NUMBER	REYNOLDS PART NUMBER
-1	1	56996-SOCN-B4016057-1	38R1Ø3Ø-2L2	B4016057-1
-2	2	-2	2R1Ø31-1LØ	-2
-3	3	-3	38R1Ø3Ø-2L2	-3
-4	4	-4	24R15ØØ-ØL6	-4
-5	5	-5	3ØR1Ø31-ØL6	-5
-6	6	-6	2R15ØØ-ØL8	-6
-7	7	-7	2R15ØØ-ØL8	-7
-8	8	-8	24R15ØØ-ØL6	-8

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A	56996	B4016057
SCALE	B Rev	SHEET 24